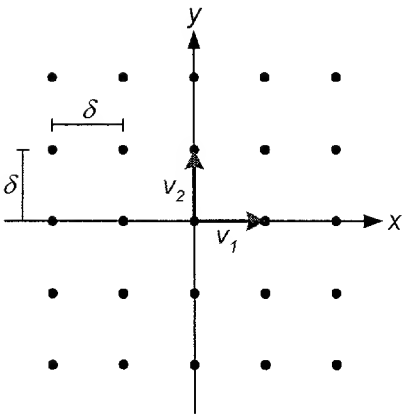


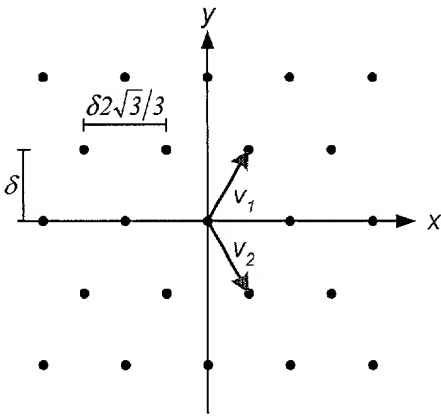
100

Map name	Sampling Requirement	Minimum Isotropy	Map Components
OpenGL	$\infty$	0	1
Cube	24	0.58	6
Dual Stereographic	32	1	2
Lat/Long	19.7	0	1
Dual Equidistant*	19.7	0.64	2
Low Distortion Area Preserving*	19.7	0.29	1
Polar-Capped* (stretch invariant)	14.8	0.71	3
Polar-Capped* (conformal)	16.5	1	3
Polar-Capped* (hexagonally reparameterized)	13.5	0.58	3
Optimal Isometric**	12.57	1	$\infty$
Optimal**	10.9	0.58	$\infty$

Fig. 2

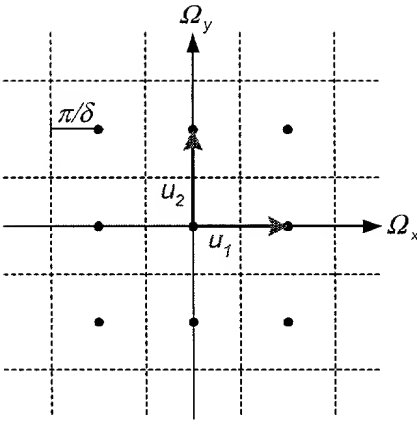


(a) rectangular

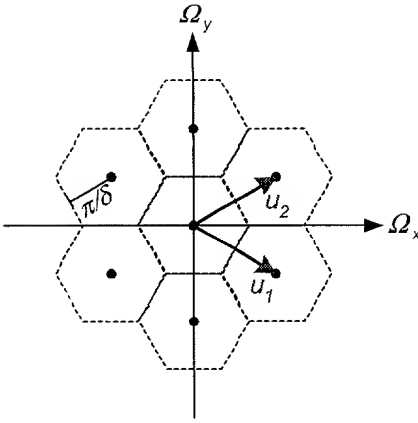


(b) hexagonal

Fig. 3



(a) rectangular



(b) hexagonal

Fig. 4

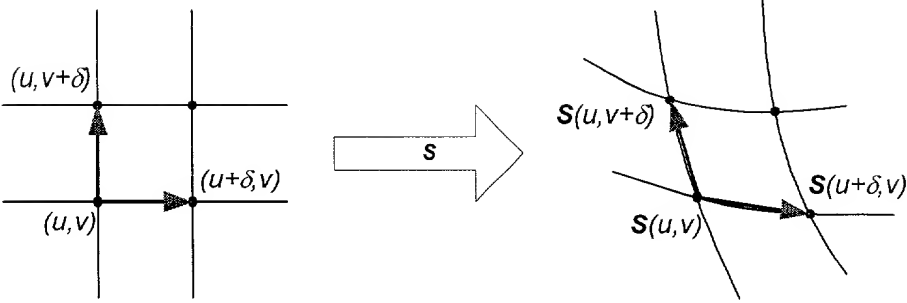
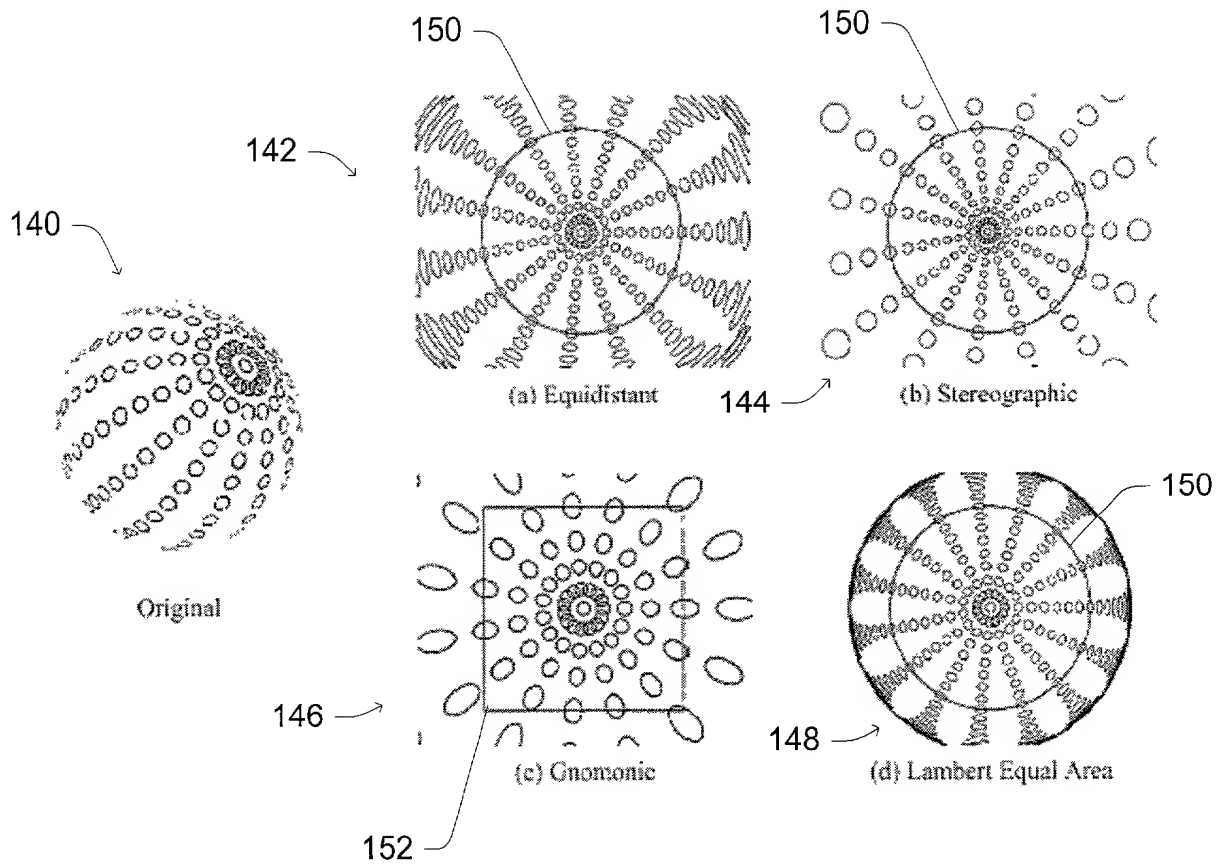


Fig. 5

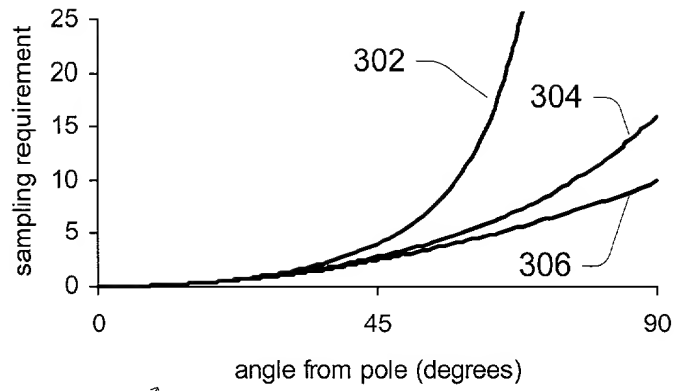


*Fig. 6*

200

	Equidistant	Gnomonic	Stereographic	Lambert Equal Area
$\theta(r)$	$(\pi/2)r$	$\cos^{-1}\left(\sqrt{1/(r^2+1)}\right)$	$\cos^{-1}\left((1-r^2)/(1+r^2)\right)$	$\cos^{-1}(1-r^2)$
properties	stretch-preserving	projects great circles to lines	conformal, projects circles to circles	area-preserving
$r^*$ covering hemisphere	$[0, 1]$	$[0, \infty]$	$[0, 1]$	$[0, 1]$
$r^*$ covering sphere	$[0, 2]$	—	$[0, \infty]$	$[0, \sqrt{2}]$
$r(\theta)$	$2\theta/\pi$	$\tan \theta$	$\tan(\theta/2)$	$\sqrt{1-\cos \theta}$
$\sin \theta$	$\sin((\pi/2)r)$	$r/\sqrt{r^2+1}$	$2r/(1+r^2)$	$r\sqrt{2-r^2}$
$\cos \theta$	$\cos((\pi/2)r)$	$\sqrt{1/(r^2+1)}$	$(1-r^2)/(1+r^2)$	$1-r^2$
$\lambda_1(\theta)$	$\pi/2$	$\cos \theta$	$1+\cos \theta$	$2/\sqrt{1+\cos \theta}$
$\lambda_2(\theta)$	$(\pi/2)\text{sinc } \theta$	$\cos^2 \theta$	$1+\cos \theta$	$\sqrt{1+\cos \theta}$
$\alpha(\theta)$	$\text{sinc } \theta$	$\cos \theta$	1	$(1+\cos \theta)/2$
$\tau(\theta)$	$(\pi/2)^2 \text{sinc } \theta$	$\cos^3 \theta$	$(1+\cos \theta)^2$	2
$\lambda_1^*(\theta)$	$\pi/2$	1	2	$2/\sqrt{1+\cos \theta}$
$M_s(\theta)$	$4\theta^2$	$4 \tan^2 \theta$	$16 \tan^2(\theta/2)$	$16 \tan^2(\theta/2)$
inverse map	$f = (\pi/2)\text{sinc}(\cos^{-1} z)$ $u = x/f$ $v = y/f$	$u = x/z$ $v = y/z$	$u = x/(1+z)$ $v = y/(1+z)$	$u = x/\sqrt{1+z}$ $v = y/\sqrt{1+z}$

Fig. 7



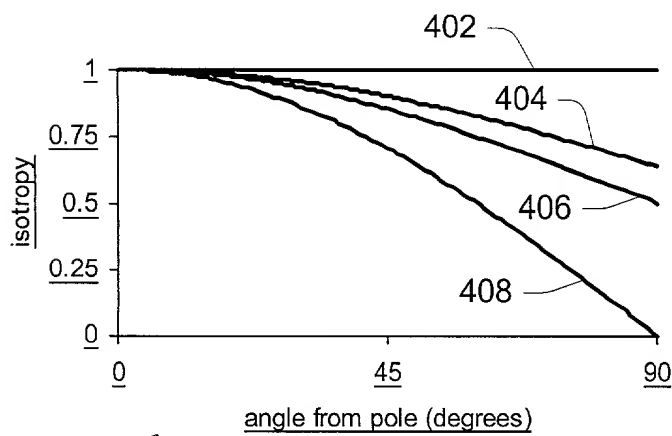
300

Fig. 8

Solid	$M_s$	$\alpha^*$	Components
tetrahedron	41.57	0.33	4
cube	24	0.58	6
octahedron	20.78	0.58	8
dodecahedron	16.65	0.79	12
icosahedron	15.16	0.79	20

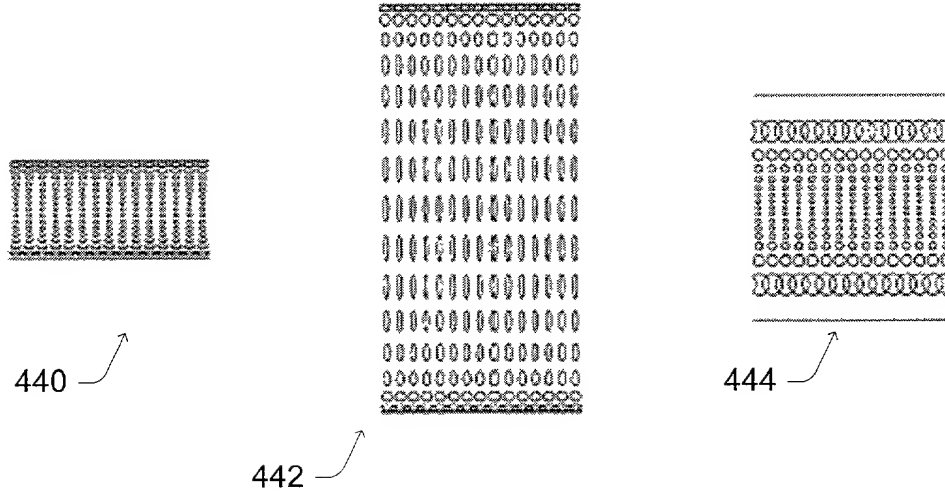
320

Fig. 9



400

Fig. 10



*Fig. 11*

500

	Plane Chart	Equal Area	Mercator
$\theta(v)$	$2\pi v$	$\sin^{-1} v$	$\sin^{-1}(\tanh(2\pi v))$
properties	stretch-preserving	area-preserving	conformal
$v$ covering sphere	$[-1/4, 1/4]$	$[-1, 1]$	$[-\infty, \infty]$
$v(\theta)$	$\theta/(2\pi)$	$\sin \theta$	$\tanh^{-1}(\sin \theta)/(2\pi)$ $= \ln((1 + \sin \theta)/(1 - \sin \theta))/(2\pi)$
$\cos \theta$	$\cos(2\pi v)$	$\sqrt{1 - v^2}$	$\operatorname{sech}(2\pi v)$ $= 2/(e^{-2\pi v} + e^{2\pi v})$
$\sin \theta$	$\sin(2\pi v)$	$v$	$\tanh(2\pi v)$ $= (e^{2\pi v} - e^{-2\pi v})/(e^{2\pi v} + e^{-2\pi v})$
$\lambda_1(\theta)$	$2\pi$	$\max(1/\cos \theta, 2\pi \cos \theta)$	$2\pi \cos \theta$
$\lambda_2(\theta)$	$2\pi \cos \theta$	$\min(1/\cos \theta, 2\pi \cos \theta)$	$2\pi \cos \theta$
$\alpha(\theta)$	$\cos \theta$	$\min(1/(2\pi \cos^2 \theta), 2\pi \cos^2 \theta)$	1
$\tau(\theta)$	$4\pi^2 \cos \theta$	$2\pi$	$4\pi^2 \cos^2 \theta$
$\lambda_1^*(\theta)$	$2\pi$	$\max(1/\cos \theta, 2\pi)$	$2\pi$
$M_s(\theta)$	$2\pi \theta$	$\max(1/\cos^2 \theta, 4\pi^2) \sin \theta$	$2\pi \tanh^{-1}(\sin \theta)$ $= \pi \ln((1 + \sin \theta)/(1 - \sin \theta))$
inverse map	$u = (\operatorname{atan} 2(y, x))/(2\pi)$ $v = (\sin^{-1} z)/(2\pi)$	$u = (\operatorname{atan} 2(y, x))/(2\pi)$ $v = z$	$u = (\operatorname{atan} 2(y, x))/(2\pi)$ $v = \tanh^{-1} z/(2\pi)$ $= \ln((1 + z)/(1 - z))/(4\pi)$

Fig. 12



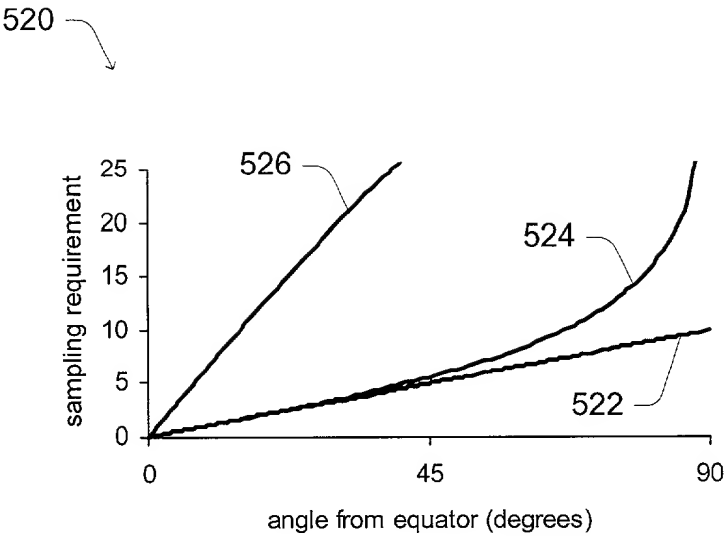


Fig. 13

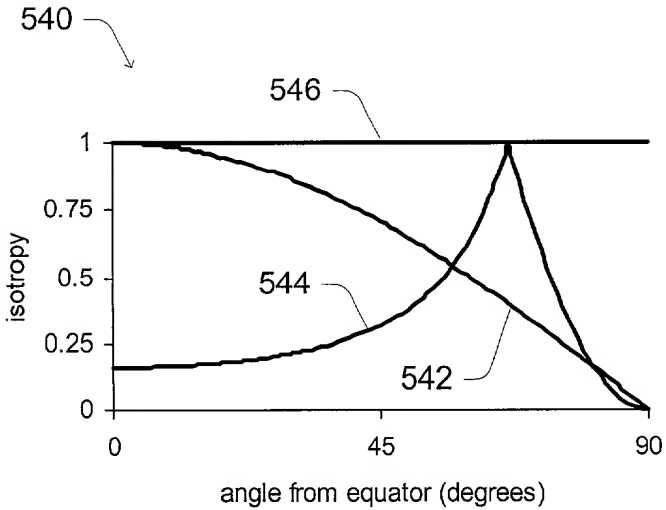
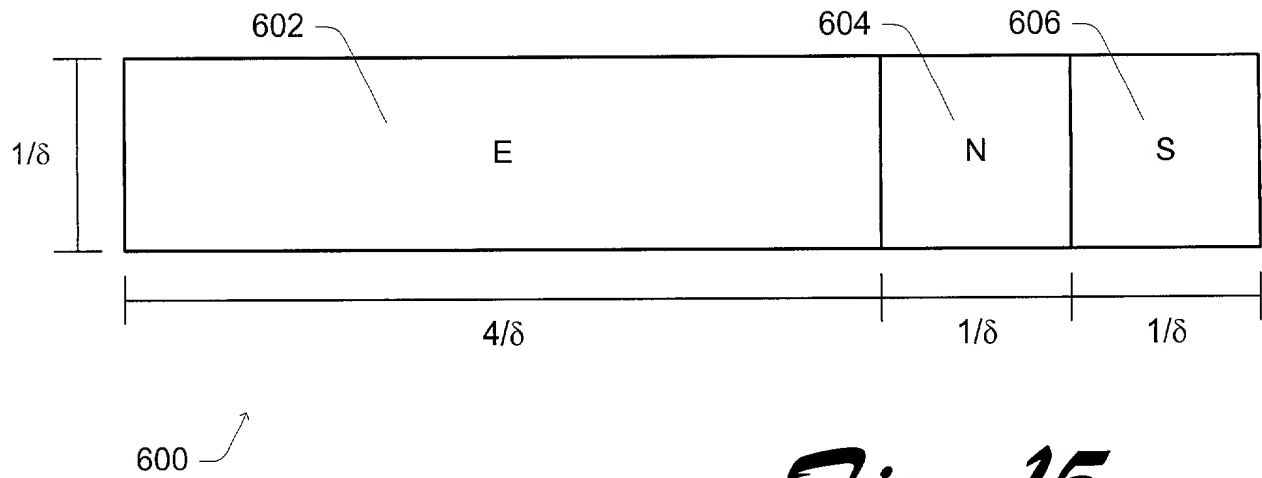
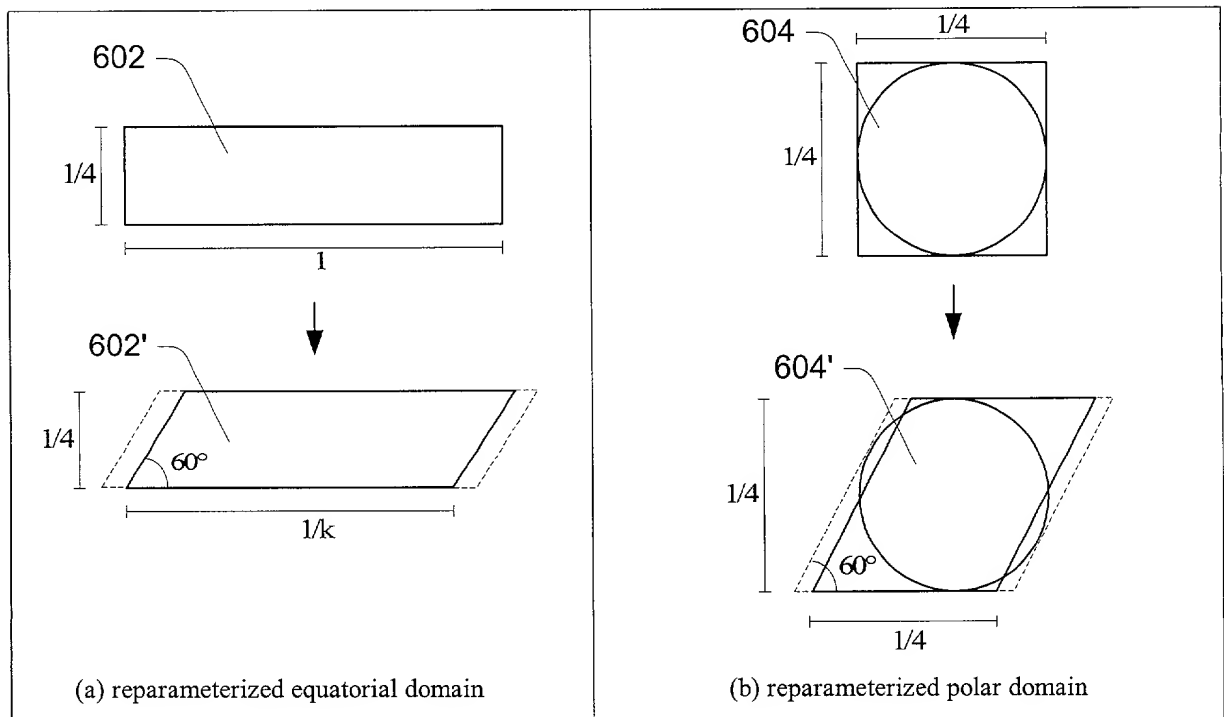


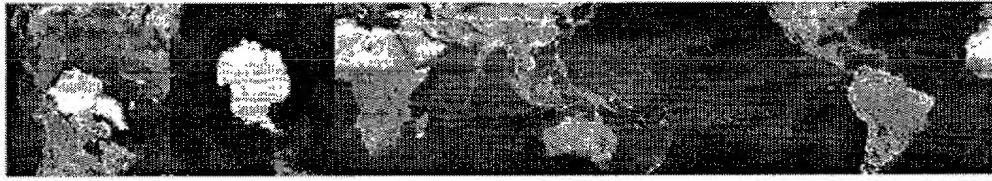
Fig. 14



*Fig. 15*



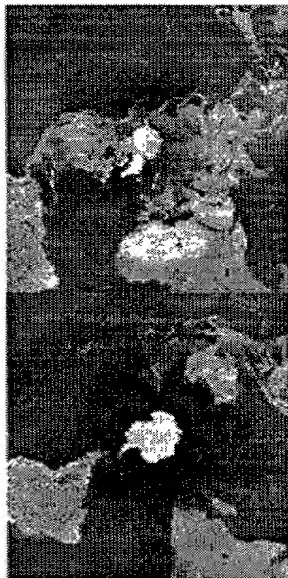
*Fig. 16*



*Fig. 17*



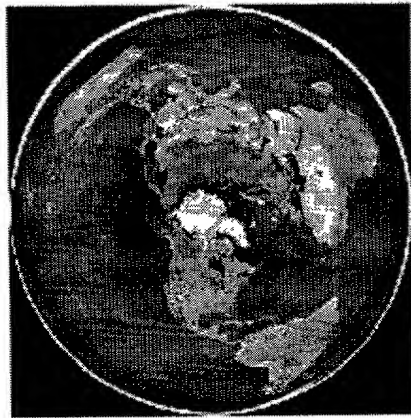
*Fig. 18*



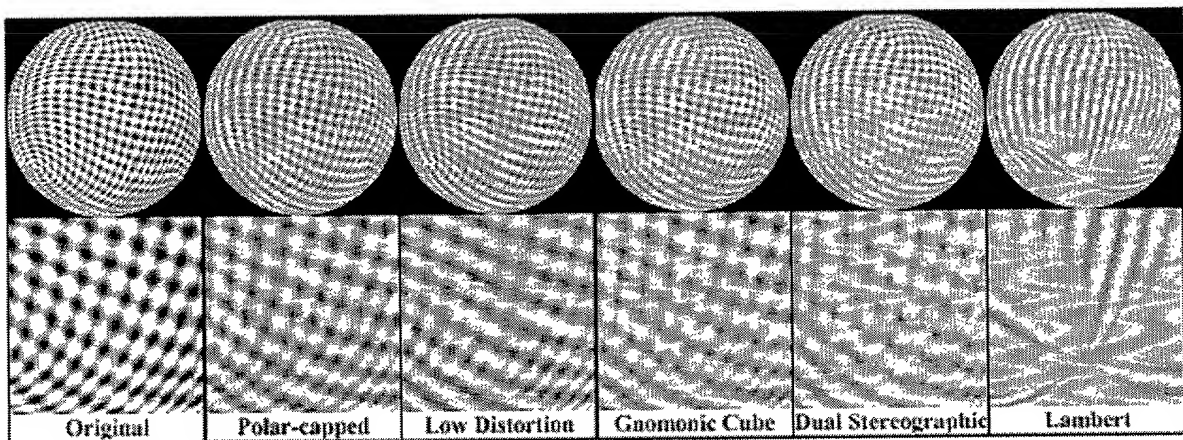
*Fig. 19*



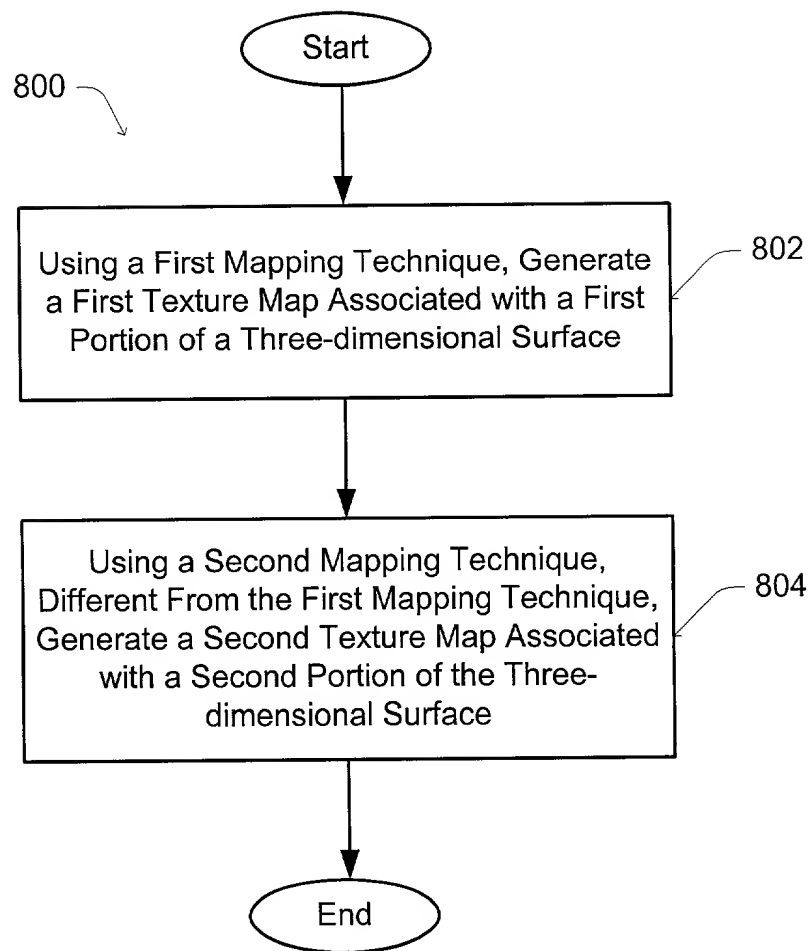
*Fig. 20*



*Fig. 21*



*Fig. 22*

*Fig. 23*